Lista de Exercícios

Exercícios Resolvidos de Simplificação de Funções Lógicas:

1)

$$S = ABC + A\overline{C} + A\overline{B}$$
$$S = A(BC + \overline{C} + \overline{B})$$
$$S = A.(BC + \overline{BC})$$
$$S = A.1$$
$$S = A$$

2)

$$S = (AB\overline{C})(\overline{A} + \overline{B} + \overline{C})$$
$$S = (AB\overline{C}.\overline{A}) + (AB\overline{C}.\overline{B}) + (AB\overline{C}.\overline{C})$$
$$S = AB\overline{C}$$

3)

$$S = (A + B + C)(\overline{A} + \overline{B} + C)$$
$$S = A\overline{A} + A\overline{B} + AC + \overline{A}B + B\overline{B} + CC + \overline{A}C + \overline{B}C + BC$$
$$S = A\overline{B} + AC + \overline{A}B + B\overline{B} + C + \overline{A}C + \overline{B}C + BC$$
$$S = A\overline{B} + \overline{A}B + C(A + 1 + \overline{A} + \overline{B} + B)$$
$$S = A\overline{B} + \overline{A}B + C$$
$$S = (A \oplus B) + C$$

4)

$$S = (\overline{\overline{AC} + B + D}) + C(\overline{ACD})$$
$$S = (\overline{\overline{A} + \overline{C} + B + D}) + C(\overline{A} + \overline{C} + \overline{D})$$
$$S = A\overline{B}C\overline{D} + \overline{A}C + C\overline{C} + C\overline{D}$$
$$S = \overline{A}C + C\overline{D}(A\overline{B} + 1)$$
$$S = \overline{A}C + C\overline{D}$$
$$S = C(\overline{A} + \overline{D})$$

5)

$$S = [\overline{(A + B).C}] + [\overline{D.(C + B)}]$$
$$S = (\overline{A + B}) + \overline{C} + \overline{D} + (\overline{C + B})$$
$$S = \overline{A}.\overline{B} + \overline{C} + \overline{D} + \overline{C}.\overline{B}$$
$$S = \overline{A}.\overline{B} + \overline{D} + \overline{C}.(\overline{B} + 1)$$
$$S = \overline{A}.\overline{B} + \overline{C} + \overline{D}$$

6)

$$S = \overline{A}\overline{B}C + \overline{A}BC + \overline{A}B\overline{C} + ABC + AB\overline{C}$$
$$S = \overline{A}(\overline{B}C + BC + B\overline{C}) + AB(C + \overline{C})$$
$$S = \overline{A}[C(B + \overline{B}) + B\overline{C}] + AB$$
$$S = \overline{A}[(C + B\overline{C}) + AB$$
$$S = \overline{A}[(C + B).(C + \overline{C})] + AB$$
$$S = \overline{A}(C + B) + AB$$
$$S = \overline{A}C + \overline{A}B + AB$$
$$S = \overline{A}C + B(\overline{A} + A)$$
$$S = \overline{A}C + B$$

7)

$$S = \overline{A}B + A.\overline{B} + AB$$
$$S = \overline{A}B + A(.\overline{B} + B)$$
$$S = \overline{A}B + A$$
$$S = (A + \overline{A}).(A + B)$$
$$S = A + B$$

8)

$$S = [\overline{\overline{X}.\overline{Y}.\overline{Z}.(X + Y + \overline{Z})}]$$
$$S = \overline{(\overline{X}.\overline{Y}.\overline{Z}X + \overline{X}.\overline{Y}.\overline{Z}Y + \overline{X}.\overline{Y}.\overline{Z}.\overline{Z})}$$
$$S = \overline{\overline{X}.\overline{Y}.\overline{Z}}$$
$$S = X + Y + Z$$

9)

$$S = \overline{X}.(X + Y) + \overline{Z} + ZY$$
$$S = \overline{X}X + \overline{X}Y + (\overline{Z} + Y).(\overline{Z} + Z)$$
$$S = \overline{X}Y + \overline{Z} + Y$$
$$S = \overline{Z} + Y(\overline{X} + 1)$$
$$S = \overline{Z} + Y$$

10)

$$S = (A + \overline{B} + AB).(A + \overline{B}).(\overline{A}B)$$
$$S = (A + \overline{B} + AB).(A\overline{A}B + \overline{A}.\overline{B}B)$$
$$S = (A + \overline{B} + AB).0$$
$$S = 0$$

11)

$$S = (A + \overline{B} + A\overline{B}).(AB + \overline{A}C + BC)$$
$$S = [A + \overline{B}(1 + A)].(AB + \overline{A}C + BC)$$
$$S = (A + \overline{B}).(AB + \overline{A}C + BC)$$
$$S = AAB + A\overline{A}C + ABC + AB\overline{B} + \overline{A}.\overline{B}C + \overline{B}.BC$$
$$S = AB + ABC + \overline{A}.\overline{B}C$$
$$S = AB(1 + C) + \overline{A}.\overline{B}C$$
$$S = AB + \overline{A}.\overline{B}C$$

12)

$$S = (AB + C + D).(C + \overline{D}).(C + \overline{D} + E)$$
$$S = (AB + C + D).(C + C\overline{D} + CE + C\overline{D} + \overline{D} + \overline{D}E)$$
$$S = (AB + C + D).[C(1 + \overline{D} + E + \overline{D}) + \overline{D}(1 + E)]$$
$$S = (AB + C + D).(C + \overline{D})$$
$$S = ABC + AB\overline{D} + C + C\overline{D} + CD + D\overline{D}$$
$$S = AB\overline{D} + C(AB + 1 + \overline{D} + D)$$
$$S = AB\overline{D} + C$$

13)

$$S = \overline{A}B(\overline{D} + D\overline{C}) + (A + \overline{A}CD).B$$
$$S = \overline{A}B[(\overline{D} + D).(\overline{D} + \overline{C})] + (AB + \overline{A}BCD)$$
$$S = \overline{A}B(\overline{D} + \overline{C}) + AB + \overline{A}BCD$$
$$S = \overline{A}B\overline{D} + \overline{A}B\overline{C} + AB + \overline{A}BCD$$
$$S = B(\overline{A}\overline{D} + \overline{A}\overline{C} + A + \overline{A}CD)$$
$$S = B[A + \overline{A}.(\overline{C} + \overline{D} + CD)]$$
$$S = B[A + \overline{A}.(\overline{C}\overline{D} + CD)]$$
$$S = B(A + \overline{A})$$
$$S = B$$

14)

$$V = (W + X + Y).(W + \overline{X} + Y).(\overline{Y} + Z).(W + Z)$$
$$V = (W + W\overline{X} + WY + XW + X\overline{X} + XY + YW + Y\overline{X} + Y).(\overline{Y}W + \overline{Y}Z + ZW + Z)$$
$$V = [W(1 + \overline{X} + Y + X + Y) + Y(X + \overline{X} + 1)].[\overline{Y}W + Z(\overline{Y} + W + 1)]$$
$$V = (W + Y).(\overline{Y}W + Z)$$
$$V = \overline{Y}W + WZ + YZ$$

Lista de Exercícios sobre Álgebra de Boole e Simplificação de Funções Lógicas

1 – Simplifique as seguintes expressões lógicas, utilizando a Álgebra de Boole:

a) $S = \overline{A}.\overline{B}.\overline{C} + \overline{A}.\overline{B}.C + \overline{A}.B.C + A.B.C$

b) $S = \overline{A}.\overline{B}.\overline{C} + \overline{A}.\overline{B}.C + A.\overline{B}.\overline{C} + A.\overline{B}.C$

c) $S = \overline{A}.\overline{B}.\overline{C} + \overline{A}.\overline{B}.C + A.\overline{B}.\overline{C} + A.\overline{B}.C + A.B.C$

d) $S = A.B.C + \overline{A}.B.C + A.\overline{B}.\overline{C} + \overline{A}.B.\overline{C} + A.\overline{B}.C + A.B.\overline{C}$

e) $S = \overline{A}.\overline{B}.C + A.B.(A.B.C + A.\overline{B}.C + C)$

f) $S = (A + \overline{B} + C).(A + \overline{B} + \overline{C}).(\overline{A} + \overline{B} + C)$

g) $S = \overline{(A + \overline{B}.(A + B)).(\overline{A} + \overline{B})}$

h) $S = (A \oplus B).\overline{B} + \overline{A}.C + \overline{A + C}$

i) $S = \overline{A \oplus B + \overline{C}} + A.\overline{B}.C + A.B.\overline{B.C}$

j) $S = \overline{(\overline{\overline{A} + B + \overline{C}.D}).(\overline{A}.B.\overline{C} + \overline{C}.D) + \overline{B}.\overline{C}}$

k) $S = \overline{(\overline{\overline{A} + B + \overline{D}}).(\overline{\overline{A}.B.\overline{C} + C}) + \overline{A.B + (B + \overline{C})}}$